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CASE REPORTS

Successful placement of an epidural catheter through a split skin graft after degloving injury of the lower back

Y. Metodiev, S. Anderson, K. Kondov
University Hospitals of Leicester, Leicester, United Kingdom

ABSTRACT
Degloving soft tissue injuries of the back are uncommon in women of child-bearing age. Treatment of such injuries may include split skin grafting of the affected area. We present the case of a 30-year-old primigravid woman who suffered degloving of the skin over the lumbar area that had been treated by split skin grafting three years prior to her pregnancy. She was seen in the antenatal anaesthetic clinic where she expressed a desire to have early epidural analgesia for her labour and delivery. An epidural catheter was placed successfully through the skin graft. The considerations for performing an invasive procedure through a skin graft and the available evidence are discussed.

Keywords: Degloving injury; Skin graft; Epidural; Pregnancy

Introduction

Degloving soft tissue injuries are a group of serious surgical conditions. They result in separation of the skin and subcutaneous tissues from the underlying structures as a consequence of applying a sudden shearing force to the skin surface.[1] These types of injury are commonly observed among males due to the higher incidence of trauma.[2] Although any part of the body can be affected, the most frequently reported sites of degloving injuries are the lower extremities, trunk, scalp and fingers.[3,4] We describe an unusual case of successful epidural catheter placement in a woman who sustained a significant degloving injury to her back three years prior to pregnancy.

Case report

A 31-year-old primigravid woman of body mass index 30.3 kg/m^2 was admitted to our institution for induction of labour because of polyhydramnios. Her past medical history included diet-controlled coeliac disease. She had been seen in an antenatal anaesthetic pre-assessment clinic at an earlier gestation. Three years before this pregnancy she had been injured in a road traffic accident at which she was ejected from a vehicle at a speed of 60 miles per hour. She sustained extensive injuries including degloving of soft tissues on her back and scalp, stable vertebral fractures of T1, T11 and T12, fracture of the transverse process of L2, a wrist fracture, partial loss of her right ear pinna and bone and soft tissue damage to her right leg. She had not undergone surgical correction of her vertebral fractures.

The main reason for the referral to the antenatal anaesthetic clinic was the extensive scarring of her back that had been noted by her midwife. The woman had undergone extensive plastic surgery of her back with reconstruction of lost tissues by split skin grafts. The largest area of reconstructive surgery was in the lumbar region where there was a rhomboid surgical area of diameter 170 x170 mm (Figs. 1 and 2). The skin graft directly overlay the spinous processes of the lumbar vertebrae and there was a significant loss of subcutaneous tissue in the area compared with areas of normal anatomy. The spinous processes were easily palpable and the graft felt fixed to them. Therefore, we expected a shorter distance from skin to the epidural space.

An ultrasound scan of her back confirmed the findings of the physical examination. The most significant feature in the transverse plane was the lack of soft tissue between the probe and the spinous processes. The epidural space was measured at a depth of approximately 4 cm at the L3-4 space. The ligamentous anatomy appeared normal in the paramedian longitudinal and the transverse planes.

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Correspondence to: Y. Metodiev, Leicester Royal Infirmary, Kensington Building, Level 4, Delivery Suite, LE1 5WW, United Kingdom.
E-mail address: yavor.metodiev1@nhs.net

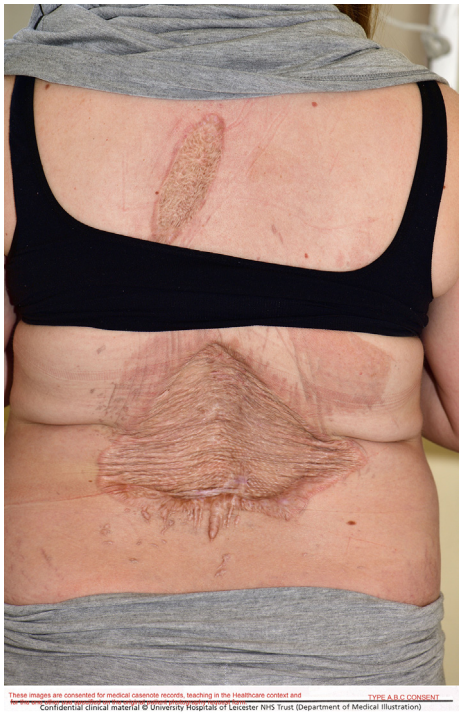

Fig. 1 Split skin graft of the lower back

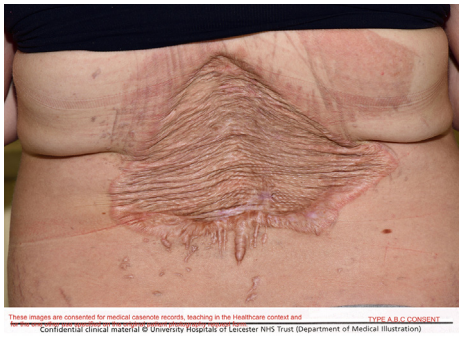

Fig. 2 Split skin graft of the lower back (close up view)

The woman requested epidural analgesia in advance and she was advised to have it early in labour to allow for technical difficulties with the procedure. Her epidural was performed by a consultant anaesthetist. She was sitting for the procedure. A standard procedure was carried out, with aseptic preparation of the area with chlorhexidine 0.5% in alcohol and sterility of the operator maintained throughout. After local anaesthesia to the grafted skin using 1% lidocaine, a 16-gauge Tuohy needle was used to identify the epidural space. Loss-of-resistance to normal saline was noted at 4 cm and an epidural catheter was inserted uneventfully. The catheter was secured with a transparent film dressing (ClearFilm®, Richardson Healthcare, Borehamwood, UK) and it was taped up to the shoulder with Hypafix® (BSN medical GmbH, Hamburg, Germany) and Mefix® (Mölnlycke Health Care AB, Göteborg, Sweden).

Shortly after an epidural test dose of 0.1% bupivacaine with fentanyl 2 μg/mL a decision to deliver operatively was made by the obstetricians due to concerns about fetal well-being. A category two caesarean delivery was performed after an epidural top-up and the epidural catheter was removed postoperatively.

The patient's postoperative course was uneventful and she was discharged home soon after her delivery. We conducted a telephone follow-up a month later, at the time of which she reported no problems.

Discussion

Degloving soft-tissue injuries can involve any part of the body and may include large areas of body surface.[5] The most commonly affected areas are the lower limbs, hands, trunk and face.[3,4,6] Nevertheless, the mechanism of trauma and the location of the degloving injury were unusual in a woman on the delivery suite. The location of the reconstructive surgery and its broad extent presented a challenge in performing a neuraxial technique. Normally, anaesthetists avoid areas of scarring or previous operation scars when considering invasive procedures and resort to an alternative technique. This is not the case when considering placement of an epidural catheter in our patient as the split skin graft was overlying all the lumbar vertebrae. Epidural analgesia is considered the gold standard for labour analgesia[7] and our patient not only requested epidural analgesia but also was not keen on alternative options. Considerations we had to discuss with the patient were the safety of performing an invasive procedure through a split skin graft, the technical difficulties associated with the lack of subcutaneous tissues and any possible residual ligamentous injury, and methods of securing the epidural catheter.

Ultrasound imaging for neuraxial techniques has been shown to minimise difficulties with epidural placement in women with inadequate body surface landmarks.[8] The use of ultrasound for neuraxial procedures in pregnancy increases the success and ease of performance.[9] The lack of normal skin and subcutaneous tissue made it more likely that loss-of-resistance would be obtained earlier than expected in our patient. We estimated the depth of the epidural space by ultrasound prior to the procedure and it proved consistent with the actual distance.

Skin grafting is associated with altered sensibility of the area and various degrees of return of normal skin sensation.[10] We considered topical anaesthesia but were concerned about lack of sterility. Instead, we anaesthetised the area by the infiltration of 1% lidocaine and this was well tolerated. Further discomfort during the procedure was not different to other patients in our experience.

After breaching the skin graft with the epidural needle, the sensation of the underlying tissues was reported as "standard" and "expected" by the operator. We found no published reports of invasive procedures performed by breaching the integrity of a split skin graft. There was one report of a successful placement of an intra-osseous needle through burned skin over the sternum.[11] Healing of the puncture site was of concern to us as the skin graft may have different regeneration properties from normal skin. Therefore, we left the catheter in situ for the shortest period possible. At later review, the patient reported that the skin had healed without any problems.

There are numerous ways to fixate an epidural catheter – from simple adhesive devices,[12] gluing[13] and subcutaneous tunnelling[14] to more complex catheter clamping devices. Our aim was to avoid injury to the skin graft from the fixation method. We used a transparent film dressing over which we secured the catheter with self-adhesive fabric. There was no subsequent blistering or irritation to the graft or surrounding skin.

In conclusion, there are no recommendations regarding labour analgesia or neuraxial techniques in a parturient with a split skin graft over the lumbar region. We believe our successful management of this case may aid decision-making in similar cases in the future.

Disclosure of interests

Y. Metodiev is currently is currently the Fellow of the International Journal of Obstetric Anesthesia.

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